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SCURCE

Klinicheskaya Meditsina, No 2, 1952, pp 66-68.

SERUM ALKALIFZ PHOSPHATASE AS AN INLICATOR OF THE SATURATION OF THE ORGANISM WITH VITAMIN C IN DYSENTERY

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Tables referred to are appended.

A number of investigators (Rey, Vinokurov, Spilioti, Danilenko) showed that when animals suffer from vitamin C hypovitaminosis, the activity of their serum alkaline phosphatase is reduced. In the present investigation, we tried to determine whether the activity of phosphatase reflects the degree of saturation with vitami. C of the organism of dysentery patients.

In carrying out this investigation, we first made a comparison between phosphatase activity in healthy persons and in dysentery patients. For that purpose, the patients were examined before treatment was started. The activity of serum alkaline phosphatase was determined by Bogdanskiy's method. The results are shown in Table 1.

To study the relationships involved in greater detail, we investigated the activity of phosphatase in dysentery patients whose organisms were saturated with vitamin C to a varying degree. All patients investigated were divided into five groups. The first four groups comprised patients who were treated with sulfanilamides. The first group was treated with sulfanilamides only; the following three groups, in addition to sulfanilamides, received increasing quantities of vitamin C (group II, 0.5 / g?/ per day; group III, 1.0 / g?/ per day; and group IV, 2.0 / g?/ per day). The fourth group consisted of patients who were treated with various drugs: gramicidin and atebrin (in enemas), bacteriophage, etc. Determinations of phosphatase activity were carried out twice: before treatment was started and on the day after the treatment had been completed, i.e., on the 7th day. All patients were kept under identical conditions as far as nutrition is concerned. The results of this series of measurements are summarized in Table 2.

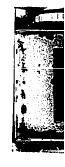
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One can see from Table 2 that treatment of dysentery with sulfanilamide drugs lowers the activity of serum phosphatase (cf. group I). However, administration of supplementary quantities of vitamin C with the food increases the phosphatase activity, and this effect grows in the measure in which loading with vitamin C is increased (cf groups and II, III, and IV. On the other hand, patients who were not treated with drugs which have any effect on the vitamin C content in the organism and did not receive any vitamin C (group V), did not show any changes in phosphatase activity after treatment.

In addition to investigating the activity of serum alkaline phosphatase, we determined the relative degree of saturation of the organism with vitamin C by other methods. After determining the content of vitamin C in plasma, according to Farmer and Ebt, we carried out determinations of the index of absorptive capacity of blood according to M. M. Eydel'man's and F. Ya. Gordon's method (1). Eydel'man and Gordon's method is based on the fact that ascorbic acid, after being added to blood in vitro, is absorbed by the proteins of the blood. The degree of absorption depends on the saturation of the organism with vitamin C: the higher the saturation of the organism, the less ascorbic acid is absorbed. Thus, a high index of absorptive capacity of blood corresponds to a low degree of saturation of the organism with Vitamin C.

The results of the determinations in question are listed in Table 3. As can be seen from Table 3, a low content of vitamin C in blood plasma and a high index of the absorptive capacity of blood correspond to a low activity of phosphatase. A normal content of vitamin C in plasma corresponds to 0.9-1.2 mg \$, while a normal index of the absorptive capacity of blood has an average value of 15, according to our data. Our investigations show that with a vitamin C content in plasma equal to 0.9-1 mg \$ and an index of absorptive capacity equal to 17, the phosphatase activity amounts to 4-6. This corresponds to values which are observed in healthy persons. A phosphatase activity lower than 4 indicates vitamin C hypovitaminosis.

To summarize, the activity of serum alkaline phosphatase is lowered in dysentery patients, particularly when they are treated with sulfanilamide drugs. Supplementary administration of vitamin C to patients lowers the biochemical expressions of vitamin C hypovitaminosis and, at the same time, increases the activity of serum alkaline phosphatase. Serum alkaline phosphatase activity in dysentery patients may serve as one of the biochemical indices of the saturation of the organism with vitamin C.

Table 1. Activity of Phosphatuse in Healthy Persons and Dysentery Patients

Group Under Observation	Serum Phosphatase Activity in Phosphatase Units						No of Persons Investigated		
	0-1	1-1.9	2-2.9	3-3-9	4-4.9	<u>5-5.9</u>	<u>6-6.9</u>		
Healthy persons				2	21	8	4	35	
Dysentery patients	1	13	38	58	14	3		127	

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Table 2. Phosphatase Activity in Various Groups of Patients Before and After Treatment

Group of Patients

•	I	<u>II</u>	Ш	TA	<u>v</u>	
No of Patients Investigated	17	16	11	13	<u> </u>	
Phosphatase activity in phos- phatase units:						
lst determina- tion /before treatment/	3.5 ± 0.3	3.5 <u>+</u> 0.3	3.2 ± 0.13	3.3 ± 0.17	3.5 ± 0.17	
2d determina- tion /after treatment/	2.0 + 0.24	3.3 + 0 <i>2</i> 7	3.9 + 0.3	4.4 <u>+</u> 0.2	3.7 <u>+</u> 0.17	

Table 3. Relationships between Phosphatase Activity, Vitamin C Content in Plasma, and Index of Absorptive Capacity of Blood

Indices	Phosphatase	No of Persons Investigated		
	1-2.9	3-3-9	4-6	
Vitamin C content in plasma (mg %)	0.6 + 0.01	0.8 + 0.02	0.9-1.0 + 0.02-0.01	125
Index of absorp- tive capacity of blood	48 <u>+</u> 4.5	27 <u>+</u> 1.0	17 ± 2.0	262

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1. M. M. Eydel'man, F. Ya. Cordon, Vrachebnoye Delo, No 5, 1948, pp 566-570

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